

April 16, 1968

D. H. WARNER

3,378,152

TRUCK UNLOADER

Filed Feb. 24, 1966

3 Sheets-Sheet 1

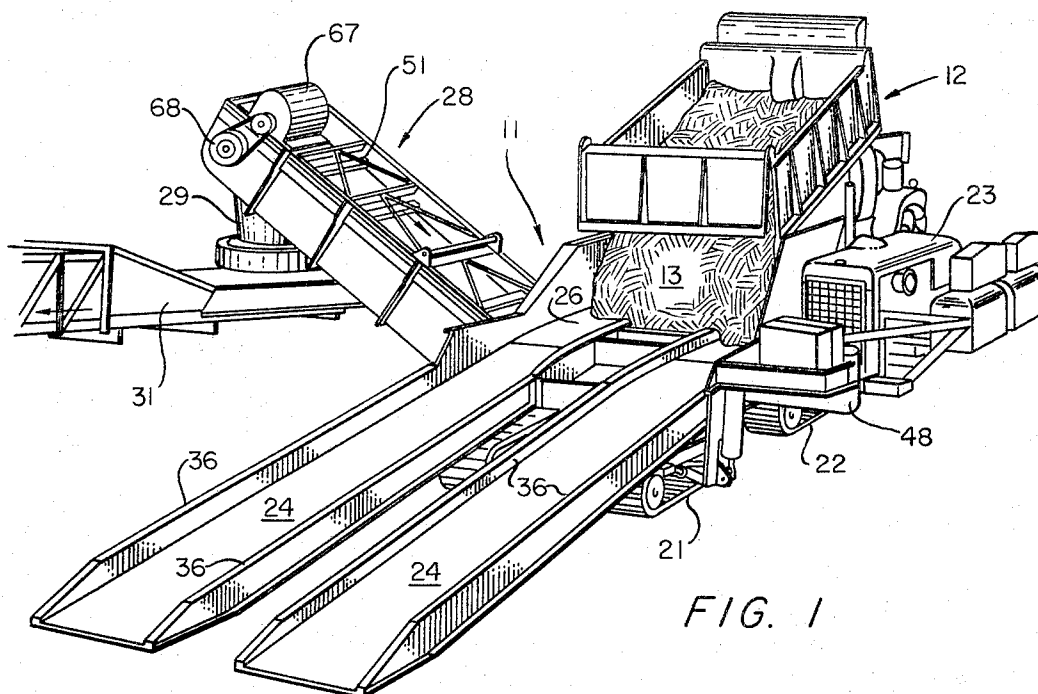


FIG. 1

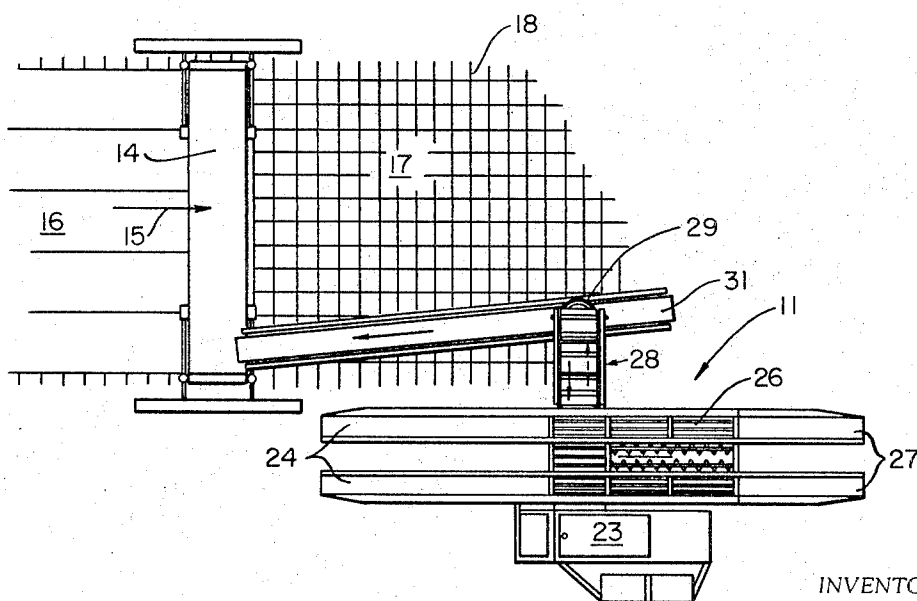


FIG. 2

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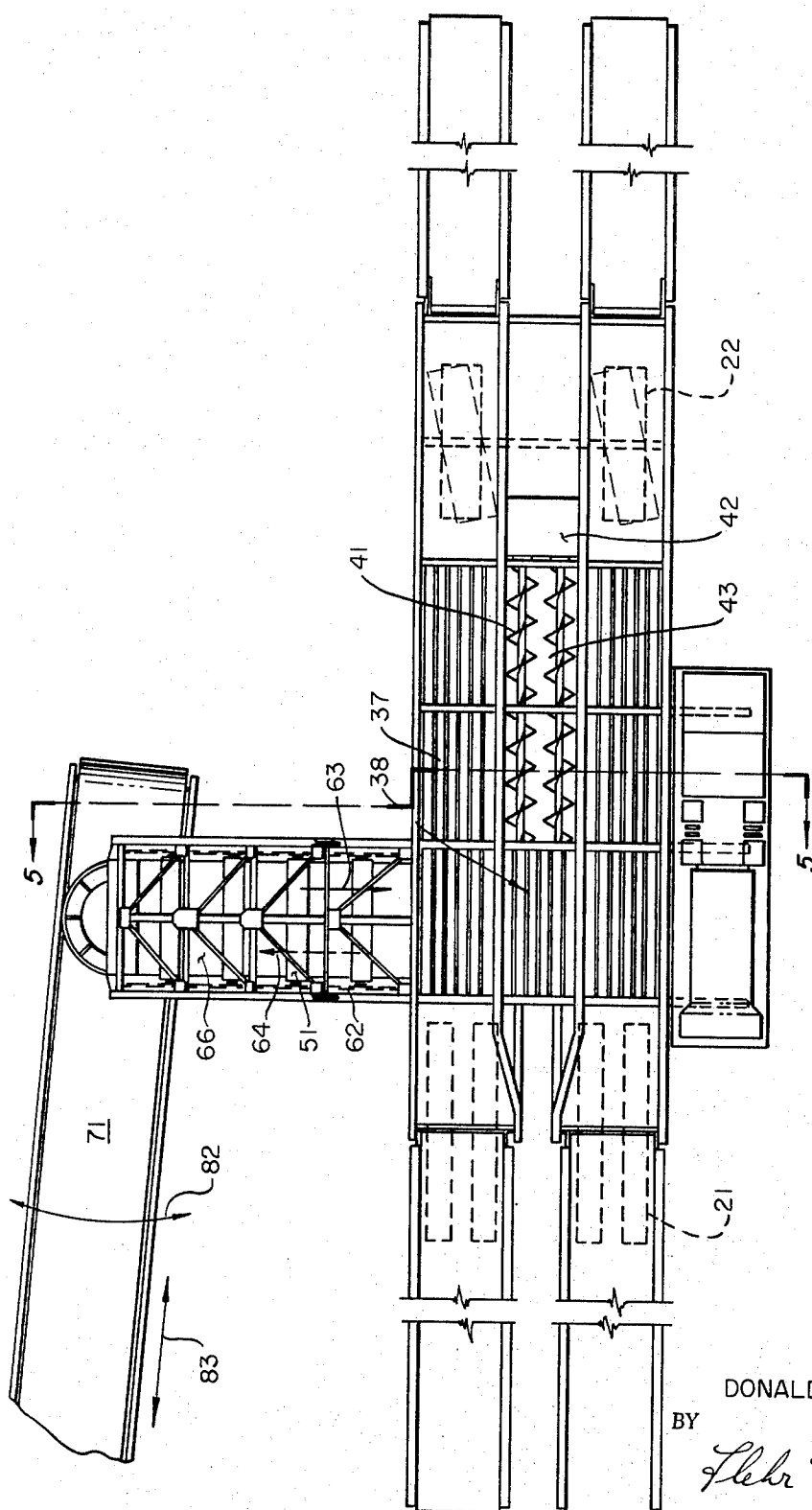
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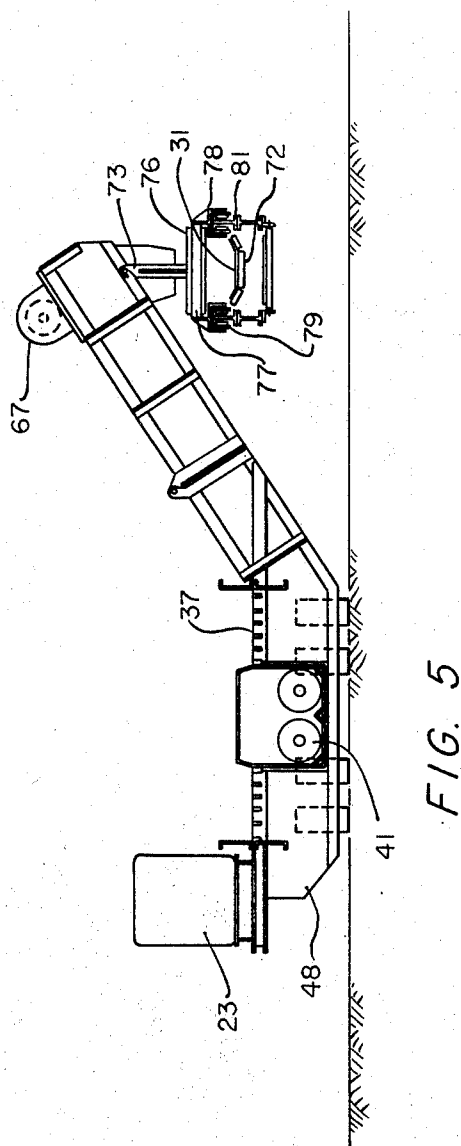
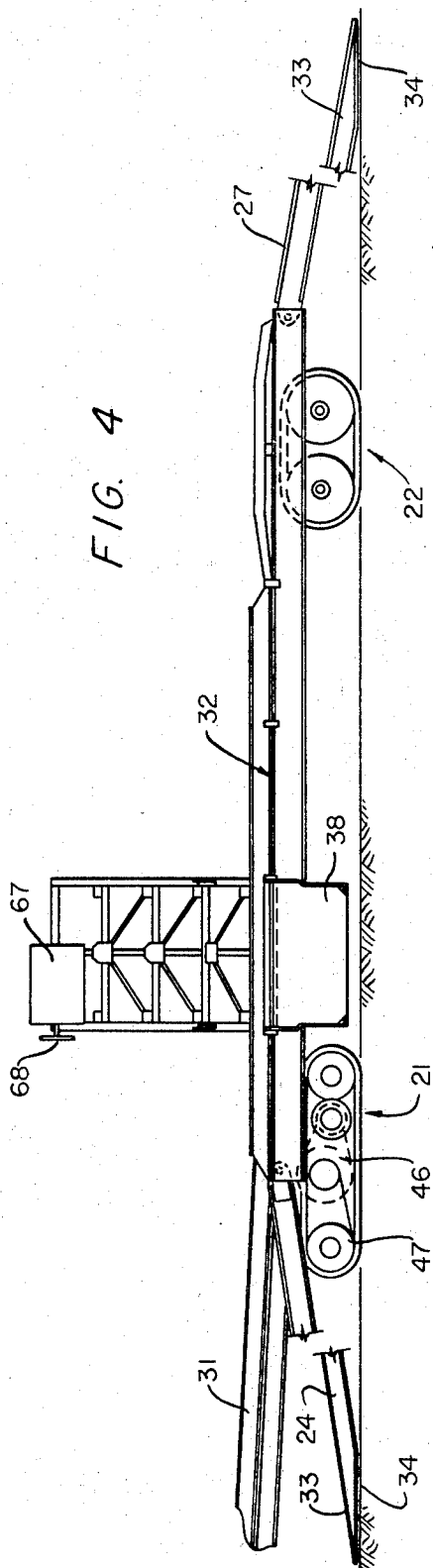
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TRUCK UNLOADER

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ABSTRACT OF THE DISCLOSURE

A self-propelled apparatus onto which dump trucks may be driven where they dump their contents into a hopper. The apparatus includes conveyor means for removing the material from the hopper and delivering it to associated apparatus.

This invention relates generally to construction equipment and more particularly to a self-propelled unloader for unloading dump trucks of various types, such as end or bottom dump trucks.

Generally, in the construction of concrete structures such as bridges, roadways, canals, dams, etc., the concrete is batched at a batch plant and then later mixed at a mixing plant and transported by truck, or transported by transit mix or agitator trucks which mix the concrete as it is transported. The mixed concrete is then unloaded from the trucks by directing it into conveyors, hoppers or other receiving apparatus by a chute which receives the concrete and delivers it to the receiving apparatus. The concrete is then transferred to the structure.

In the construction of roadways, the concrete is transferred from a hopper to conveyors which deliver it to an associated paving machine. The paving machine moves along the roadbed to progressively lay the pavement.

In general, transit mix or agitator trucks are relatively expensive and require considerable time to load and unload. Both of these factors add to the overall cost of construction projects. Thus, it is desirable to be able to employ conventional trucks to transport concrete which is mixed at a mixing plant.

In accordance with the present invention, a self-propelled truck unloader is provided which accommodates and receives concrete or material from conventional bottom or end dump trucks, collects the dumped material, elevates the material and delivers it into associated equipment.

It is, therefore, an object of the present invention to provide a truck unloader for use with conventional bottom or end dump trucks.

It is another object of the present invention to provide a truck unloader which is self-propelled to travel with associated equipment such as highway pavers.

It is still a further object of the present invention to provide a truck unloader onto which a dump truck is driven for unloading while the unloader is moving under its own power.

These and other objects of the invention will become more clearly apparent from the following description taken in conjunction with the accompanying drawing.

Referring to the drawings:

FIGURE 1 is a perspective view showing a self-propelled truck unloader in accordance with the invention with an end truck associated therewith;

FIGURE 2 is a plan view showing a self-propelled truck unloader delivering material to a paving apparatus;

FIGURE 3 is a plan view of a self-propelled truck unloader incorporating the present invention;

FIGURE 4 is a side elevational view of the truck unloader shown in FIGURE 3; and

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FIGURE 5 is a sectional view taken along the line 5-5 of FIGURE 3.

Referring to FIGURES 1 and 2, the self-propelled truck unloader 11 is shown carrying an end dump truck 12 which is dumping concrete 13. It will be apparent that the unloader 11 is suitable for use with bottom dump trucks and the invention is not intended to be limited in this respect. The unloader is shown cooperating with a self-propelled concrete paving machine 14 travelling in the direction of the arrow 15 to lay pavement 16 on the bed 17. The bed 17 may be provided with reinforcing bars 18 or mesh.

The apparatus 11 is propelled by tracks 21 which may be driven by a hydraulic motor, as will be presently described, and is steered by tracks 22. Motive means, for example, an internal combustion engine 23, provides power for generating hydraulic fluid pressure which serves to drive the associated hydraulic motors. It is to be, of course, understood that the prime mover 23 may drive electrical generators and that the various power means may comprise electrical motors, or that the apparatus may be mechanically driven from internal combustion engines.

The apparatus 11 includes spaced on-ramps 24 onto which the vehicle 12 is driven and guided until it reaches the position generally designated at 26, FIGURE 2, where the load is dumped or discharged by the end dump truck. When the vehicle has been unloaded, it then leaves the apparatus by travelling down the spaced off-ramps 27. It is seen that a line of vehicles may be formed and sequentially unload into the apparatus.

The material dumped onto the apparatus in the region 26 falls into a hopper, to be presently described, from which it is lifted by a bucket or drag conveyor 28 and discharged into a funnel-like chute 29. The chute 29 directs the material onto conveyor belt 31 which delivers the material to associated receiving apparatus, such as the self-propelled paving machine.

As will be presently described, the conveyor belt is swivel suspended on the chute 29 so that it may be rotated to discharge material directly behind or to the side of the apparatus and so that the belt can be extended and retracted to accommodate relative movement between the self-propelled unloader and the associated equipment.

Referring now specifically to the remaining figures, the on-ramps 24 and off-ramps 27 are articulated on a main frame or platform 32 whereby they may be lifted when travelling. In general practice, the ramps are disposed so that the ends 33 are held slightly above the ground, as indicated by numeral 34, by hydraulic accumulators. Thus, the apparatus can move, and yet a truck driving onto the on-ramp 24 can overcome the forces of the hydraulic accumulator and deflect the ramp slightly. The ramp then engages the ground and the truck is supported from the ground as it drives onto the main platform 32. When the truck drives off the apparatus, it overcomes the forces of the associated hydraulic accumulator and deflects the off-ramp 27 so that it engages the ground and supports the vehicle. Preferably, the on-ramps 24 and off-ramps 27 include guides 36 for guiding the vehicle as it travels on and off the unloader.

The main platform 32 includes an open grillwork 37 for supporting the truck and through which the material being delivered may pass. Once the end dump truck is positioned on the apparatus, it dumps through the grillwork and directly into a hopper 38. Bottom dump trucks may dump anywhere along the unloader when it falls into the screw conveyors 41 which move the material into the hopper 38. The screw conveyors 41 may be driven by suitable motive means 42, such as hydraulic

motors, and associated gearing, so as to cause the material to move down the longitudinal troughs 43 into the hopper as described.

The main frame 32 is carried on tracks 21 and 22. As previously described, one set of tracks 21 is driven. It is apparent that, if desired, both sets may be driven. The drive means may comprise a hydraulic motor 46, such as shown in FIGURE 4, which, through a suitable belt, drives the drive sprocket 47 to move the tracks and propel or drive the apparatus. The front wheels are shown in dotted outline in FIGURE 3 as being rotatable whereby to steer the apparatus.

The prime mover 23 and associated equipment are carried on a pair of outriggers 48 which extend outwardly from the side of the main frame 32 which is opposite the bucket conveyor 28. This counterbalances the weight of the bucket and belt conveyors.

The bucket or drag conveyor is a well known type and includes buckets 51 supported upon spaced endless chains 62. The upper flight of the bucket travels downwardly as indicated by the arrow 63, and the lower flight of the conveyor travels upwardly as indicated by the arrow 64. Thus, the buckets serve to engage material in the hopper 38 and drag the same upwardly along the bottom surface 66 of the conveyor to the top of the conveyor where the material falls into the chute 29 previously described. The bucket line may be driven by suitable motive means, for example, the hydraulic motor indicated at 67 which drives a sprocket wheel 68.

The chute 29 discharges material onto a conveyor belt 31 carried on rollers 72 and serving to convey the material discharged thereon to associated equipment as previously described. The conveyor belt and supporting frame are carried on the frame of the bucket conveyor by spaced hook members 73. The spaced hook members carry an inner ring 76 which cooperates with an outer race 77. The outer race 77 includes downwardly depending members 78 which carry rollers 79. The rollers 79 engage longitudinal tracks 81 formed on the conveyor belt supporting frame. By this arrangement, the conveyor belt may be rotated as indicated by the arrow 82 in FIGURE 3, or may be moved longitudinally back and forth on the rollers 78 as indicated by the arrow 83 whereby to discharge material in any desired direction and/or position. This arrangement accommodates relative movement between the self-propelled unloader and the associated equipment.

Thus, it is seen that there is provided an improved self-propelled unloading apparatus. Conventional bottom

or end dump trucks may be driven thereon to dump their loads onto the apparatus and leave. The apparatus serves to convey the material into a hopper from which it is withdrawn by a suitable lifting means, such as a bucket conveyor, and discharged onto a transverse conveyor, such as a belt conveyor, for delivery to associated equipment. The apparatus makes it possible to employ conventional dump trucks for transporting concrete. However, it is to be observed that the apparatus would also be suitable for receiving and delivering aggregate material such as sand, gravel or any combination thereof, to associated equipment.

I claim:

1. A truck unloader comprising a main frame, a truck receiving platform supported on such frame, said truck receiving platform including an open grillwork to permit material dumped thereon to pass therethrough, on-ramps and off-ramps carried on said frame whereby a truck may be driven onto and off of said platform, a material receiving hopper disposed beneath said platform to receive material delivered through said platform, a lifting conveyor mounted on one side of said apparatus for removing material from the hopper and transferring and lifting the material, a delivery conveyor supported from said lifting conveyor to receive material from the lifting conveyor and transferring and delivering the material to selected locations adjacent said unloader, and means carried on the other side of said apparatus for supplying power thereto as required.

2. A truck unloader as in claim 1 wherein said frame is mounted on spaced wheels or tracks and means are provided for driving and steering said wheels or tracks.

3. A truck unloader as in claim 1 wherein said lifting conveyor means comprises a bucket or drag conveyor and said delivery conveyor means comprises a belt conveyor.

4. A truck unloader as in claim 1 wherein said delivery conveyor is mounted for longitudinal and rotative movement with respect to said unloader.

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